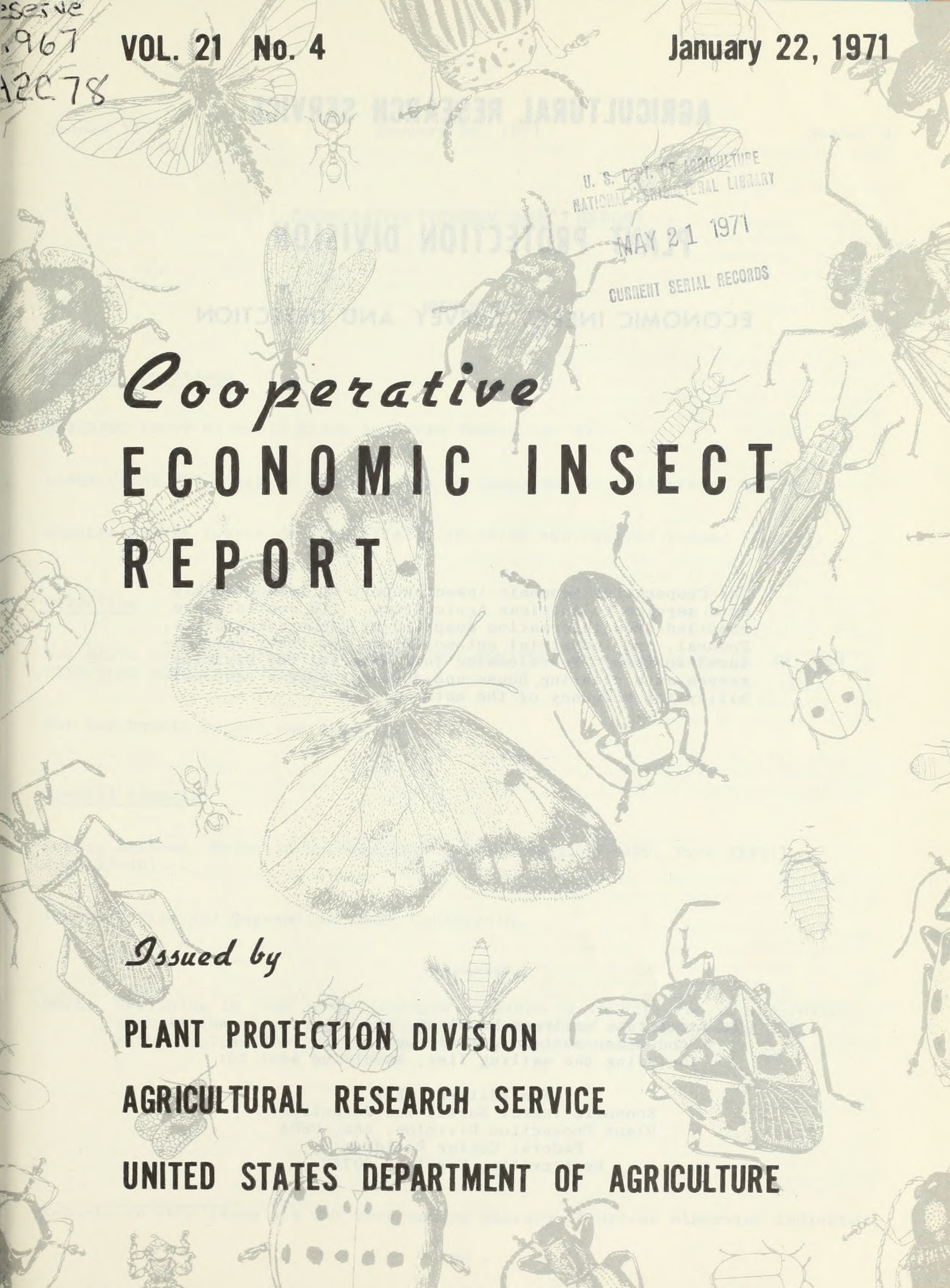
Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

Reserve
1.967
A2C78

VOL. 21 No. 4 January 22, 1971

U. S. DEPT. OF AGRICULTURE
NATIONAL AGRICULTURAL LIBRARY
MAY 21 1971
CURRENT SERIAL RECORDS



Cooperative ECONOMIC INSECT REPORT

Issued by

PLANT PROTECTION DIVISION
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

PLANT PROTECTION DIVISION

ECONOMIC INSECT SURVEY AND DETECTION

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

To facilitate mailroom handling, all reports, inquiries, and other matters pertaining to this release, including the mailing list, should be sent to:

The Editors, CEIR
Economic Insect Survey and Detection
Plant Protection Division, ARS, USDA
Federal Center Building
Hyattsville, Maryland 20782

Volume 21 January 22, 1971 Number 4

COOPERATIVE ECONOMIC INSECT REPORT

HIGHLIGHTS

Current Conditions

GREENBUG heavy on small grain in north Texas. (p. 31).

RANGE CRANE FLY heavy in 50,000 acres of rangeland in California. (p. 31).

ALFALFA WEEVIL larvae damaged alfalfa in north and central Texas. (p. 31).

Detection

New State records include LESPEDEZA CYST NEMATODE from Tennessee (p. 32) and PINE TUBE MOTH from Missouri (p. 32).

For new county record see page 33.

Special Reports

Survey Methods. Selected References for First Half of 1970. Part XXXIII. (pp. 35-40).

Imported Fire Ant Quarantine. Map. Centerfold.

****

NOTE: Beginning in this issue, changes in names of insects are in accordance with the new list of "Common Names of Insects" as approved by The Entomological Society of America and issued December 1970.

Reports in this issue are for week ending January 15 unless otherwise indicated.

CONTENTS

Special Insects of Regional Significance.....................................31

Insects Affecting

Corn, Sorghum, Sugarcane..........31
Turf, Pastures, Rangeland..........31
Forage Legumes.........................31
Soybeans..................................32
Cotton......................................32
Cole Crops................................32
Deciduous Fruits and Nuts.........32
Small Fruits...............................32
Ornamentals..............................32
Forest and Shade Trees.............32
Man and Animals.......................33
Stored Products........................33

Federal and State Plant Protection Programs..33
Detection...33
Light Trap Collections..33
Hawaii Insect Report..34
Survey Methods. Selected References for First Half of 1970. Part XXXIII.......35
Imported Fire Ant Quarantine. Map. Centerfold.

NATIONAL WEATHER SERVICE'S 30-DAY OUTLOOK

MID-JANUARY TO MID-FEBRUARY 1971

The National Weather Service's 30-day outlook for mid-January to mid-February is for temperatures to average below seasonal normals over the eastern half of the Nation and also the northern Plains. Above normal temperatures are indicated for central and southern portions of the intermountain region and the Pacific coast, and also most of the southern Plains. Elsewhere near normal temperatures are in prospect. Precipitation is expected to exceed normal over the Atlantic and east Gulf Coast States as well as the Pacific Northwest, the central Pacific coast and western portions of the northern Plains. Subnormal totals are in prospect for the southern Rockies and the southern Plains. In unspecified areas near normal precipitation is expected.

Weather forecast given here is based on the official 30-day "Resume and Outlook" published twice a month by the National Weather Service. You can subscribe through the Superintendent of Documents, Washington, D.C. 20250. Price $5.00 a year.

WEATHER OF THE WEEK ENDING JANUARY 18

HIGHLIGHTS: Miserable weather occurred in most northern and central areas last week. The South was exceedingly pleasant.

PRECIPITATION: Early in week as snow continued in New England, another arctic outbreak brought windy wet weather to the West. Rain fell along the coast with snow in western mountain areas and eastward to the Great Lakes. At midweek, snow fell along the coast accumulating to 14 inches at Astoria, Oregon, by Wednesday morning. At noon Wednesday, a front extended from the North Central States to the Carolinas with miserable weather on both sides of it. Snow fell in the Northern States as sleet, freezing rain, or freezing drizzle with fog occurring south of the snow belt. By Thursday morning, freezing precipitation had coated a large area from Illinois to northern and middle Atlantic States with a layer of ice that made walking or driving risky. As the weekend approached, an intense storm off the Pacific coast was bringing heavy precipitation and strong winds to the Northwest. After gusting to 109 m.p.h. at Cape Blanco, Oregon, late Friday, winds slackened somewhat but by Sunday another storm was pounding the Pacific coast with winds up to 60 to 70 m.p.h. The leading edge of a cold air mass set off generous thundershowers in northern Georgia and western South Carolina Thursday. Light precipitation occurred over the Atlantic Coastal States Friday and from the Great Lakes to the Ohio River Saturday. Weather of the week continued on page 34.

SPECIAL INSECTS OF REGIONAL SIGNIFICANCE

BEET LEAFHOPPER (Circulifer tenellus) - CALIFORNIA - Delimiting survey shows populations throughout west side breeding grounds of San Joaquin Valley from Kings and Kern County lines north to Los Banos. Found on southern exposures again after lapse of several years. Some leafhoppers remained in valley floor this fall and now infesting winter breeding grounds. Counts of 2-12 per 10 sweeps in Avenal Gap area of southern Kings County. No treatments in this area since 1966. Counts of 15-25 per 10 sweeps on west side in Kettleman Hills area. Winter control program underway, but rain may delay treatment in some locations. (Cal. Coop. Rpt.).

CORN EARWORM (Heliothis zea) - TENNESSEE - Control cost, and yield and quality losses to corn during 1970 estimated to be $491,500 and to soybeans $90,000. (Gordon).

CORN LEAF APHID (Rhopalosiphum maidis) - TEXAS - Light on small grains in Brazos, Robertson, Milam, Burleson, and Lee Counties. Populations in all fields examined ranged 0-5 per linear foot of row. (Green).

GREENBUG (Schizaphis graminum) - OKLAHOMA - Ranged 30-40 per linear foot of wheat in Washita and Caddo Counties. Scattered fields sprayed in southwest area. (Okla. Coop. Sur.). TEXAS - Populations heavy in several northern counties. Many fields showed visible damage. Controls applied to several hundred acres of wheat. Cold weather during early January slowed aphid reproduction in northern areas. Populations light in Brazos, Robertson, Milam, Burleson, and Lee Counties. Counts of 10 per linear row foot in some Brazos County fields. Significant populations of braconid wasps noted in fields in Brazos County. (Green, Turney).

SPOTTED ALFALFA APHID (Therioaphis maculata) - TEXAS - Ranged up to 100 per 20 sweeps of alfalfa in Brazos and Robertson Counties. (Green).

TOBACCO HORNWORM (Manduca sexta) - TENNESSEE - Control cost, and yield and quality losses to tobacco during 1970 estimated to be $215,600. (Gordon).

CORN, SORGHUM, SUGARCANE

EUROPEAN CORN BORER (Ostrinia nubilalis) - INDIANA - Cornstalk samples from west-central and southwest districts showed larval mortality of 4-17 percent, mostly due to mechanical cornpicker injury. (Meyer).

SUGARCANE BORER (Diatraea saccharalis) - FLORIDA - Active on sugarcane in Okeechobee area of Palm Beach County; larvae not yet going into diapause, probably due to lack of cold weather. (Summers, Jan. 8).

YELLOW SUGARCANE APHID (Sipha flava) - FLORIDA - Moderately heavy on young sugarcane in Lake Okeechobee area of Palm Beach County January 8. (Summers).

TURF, PASTURES, RANGELAND

RANGE CRANE FLY (Tipula simplex) - CALIFORNIA - Populations heavy in Tulare County, 50,000 acres involved. About 500 acres may need immediate treatment and up to 3,000 acres may be treated. Larval counts of 300-400 per square foot. Pupation underway. Many "slicks" obvious on infested slopes of foothill rangeland. (Cal. Coop. Rpt.).

FORAGE LEGUMES

ALFALFA WEEVIL (Hypera postica) - TEXAS - Larvae on alfalfa in Ellis, Falls, Robertson, and Brazos Counties. Alfalfa about 3 inches tall severely damaged in Falls County. Apparently infestations widespread throughout county. Severe damage noted in all alfalfa examined in Robertson and Brazos Counties. Larvae ranged up to 175 per 20 sweeps in one field in Robertson County. (Green et al.).

TENNESSEE - Control cost, and yield and quality losses to alfalfa during 1970 estimated to be $514,400. (Gordon). KENTUCKY - Eggs averaged 79 per square foot of alfalfa in central areas. (Barnett, Jan. 8). MISSOURI - Eggs per square foot of forage legumes during December in one field each averaged 40.4 in Ste. Genevieve and 22.6 in Laclede Counties. (Munson). INDIANA - Egg deposition did not exceed that observed in December 1969, according to samples taken in mid-December 1970. (Wilson). Square-foot sample from Sullivan County yielded 64 eggs, slightly less than number of H. punctata (clover leaf weevil) eggs. (Meyer).

PEA APHID (Acyrthosiphon pisum) - INDIANA - Collected 30 immatures per square foot in soil samples, which included 3-inch alfalfa foliage, from Gibson County on January 6. (Meyer).

LESPEDEZA CYST NEMATODE (Heterodera lespedezae) - TENNESSEE - Cysts collected from lespedeza on farm at Brownsville, Haywood County, by Patrick January 11, 1971. Determined by A.M. Golden. This is a new State record. (PPD).

SOYBEANS

BEAN LEAF BEETLE (Cerotoma trifurcata) - INDIANA - Adults 1 per 5 samples of duff (4 inches in diameter) in wheat and weed stubble, fence rows, and ditches in west-central and southwest districts. (Meyer).

COTTON

BOLL WEEVIL (Anthonomus grandis) - TENNESSEE - Control cost, and yield and quality losses to cotton during 1970 estimated to be $1,666,200. (Gordon).

BOLLWORM (Heliothis zea) - TENNESSEE - Control cost, and yield and quality losses to cotton during 1970 estimated to be $2,525,500. (Gordon).

COLE CROPS

TURNIP APHID (Hyadaphis pseudobrassicae) - FLORIDA - Heavy on Chinese cabbage at Belle Glade, Palm Beach County. Caused extreme stunting and death to many plants; situation has existed about 30 days; counts show 150-200 aphids (mostly nymphs) per square inch on undersurface of leaf. (Janes, Jan. 8).

DECIDUOUS FRUITS AND NUTS

WOOLLY APPLE APHID (Eriosoma lanigerum) - CALIFORNIA - Counts of 1,000 per limb on scattered apple trees throughout orchard at Julian, San Diego County. (Cal. Coop. Rpt.).

SMALL FRUITS

TWOSPOTTED SPIDER MITE (Tetranychus urticae) - FLORIDA - Building up on strawberries at Plant City, Hillsborough County, and Bradenton, Manatee County. (Poe, Jan. 8).

ORNAMENTALS

A SOFT SCALE (Saissetia miranda) - CALIFORNIA - Counts of 8 eggs, nymphs, and adults per leaf on Ficus lyrata (fiddleleaf fig) nursery stock at Fallbrook, San Diego County. (Cal. Coop. Rpt.).

FOREST AND SHADE TREES

PINE TUBE MOTH (Argyrotaenia pinatubana) - MISSOURI - Larvae collected from white pine at Chesterfield, St. Louis County, by F. Courtney. Adult emerged December 18, 1970. Reared and determined by W.S. Craig. This is a new State record. (Munson).

MAN AND ANIMALS

SCREWWORM (*Cochliomyia hominivorax*) - No cases reported in U.S. January 10-16. Total of 153 laboratory-confirmed cases reported in portion of Barrier Zone in Republic of Mexico as follows: Sonora 119, Chihuahua 15, Coahuila 2, Nuevo Leon 1, Tamaulipas 16. Total of 19 cases reported in Mexico south of Barrier Zone. Barrier Zone is area where eradication operation underway to prevent establishment of self-sustaining population in U.S. Sterile screwworm flies released: Texas 7,868,000; Mexico 109,642,000. (Anim. Health Div.).

COMMON CATTLE GRUB (*Hypoderma lineatum*) - OKLAHOMA - Ranged 0-22 per head (averaged 8) on yearling steers in Payne County. Light in Mayes and Choctaw Counties. (Okla. Coop. Sur.).

FACE FLY (*Musca autumnalis*) - CALIFORNIA - Adults hibernating in groups of 500+ in food storage tank on ranch at Willows, Glenn County. (Cal. Coop. Rpt.).

CLUSTER FLY (*Pollenia rudis*) - MARYLAND - Annoying populations infesting several homes in Prince Georges and Montgomery Counties. (U. Md., Ent. Dept.).

HOG LOUSE (*Haematopinus suis*) - MISSISSIPPI - Averaged 1.5 behind each ear on 30 head of hogs at State College, Oktibbeha County. (Sartor).

TROPICAL RAT MITE (*Ornithonyssus bacoti*) - CALIFORNIA - Hundreds found on walls in residence at Sacramento, Sacramento County. Some of inhabitants being bitten. Cold weather probably restricts rat activity outside. (Cal. Coop. Rpt.).

BROWN DOG TICK (*Rhipicephalus sanguineus*) - MARYLAND - Isolated infestations in Baltimore, Prince Georges, and Anne Arundel Counties. Controls required. (U. Md., Ent. Dept.).

STORED PRODUCTS

POTATO TUBERWORM (*Phthorimaea operculella*) - ALABAMA - Larvae light in farm stored potatoes in De Kalb County, December 1970. Additional survey and controls planned. This is a new county record. (Barnett, Spears).

FEDERAL AND STATE PLANT PROTECTION PROGRAMS

GOLDEN NEMATODE (*Heterodera rostochiensis*) - NEW YORK - Found 3 potato fields infested on Long Island during period January 8-14. Total of 95 acres involved in the Cutchogue and Mattituck areas of Suffolk County. (PPD).

WHITE GARDEN SNAIL (*Theba pisana*) - CALIFORNIA - First of 4 bait applications being applied to 15 city blocks. Last live snail recorded in 1968. Excessive rains should activate snails if any present. This is final year of treatment if no live snails found in eradication area at Manhattan Beach, Los Angeles County. (Cal. Coop. Rpt.).

DETECTION

New State Records - LESPEDEZA CYST NEMATODE (*Heterodera lespedezae*) TENNESSEE - Haywood County (p. 32). PINE TUBE MOTH (*Argyrotaenia pinatubana*) MISSOURI - St. Louis County (p. 32).

New County Record - POTATO TUBERWORM (*Phthorimaea operculella*) ALABAMA - De Kalb (p. 33).

LIGHT TRAP COLLECTIONS

FLORIDA - Gainesville, 1/8-13, BL - Black cutworm (*Agrotis ipsilon*) 3, granulate cutworm (*Feltia subterranea*) 4.

HAWAII INSECT REPORT

General Vegetables - BEET ARMYWORM (*Spodoptera exigua*) light to moderate in green onion fields, about 15-20 percent of leaves infested, at Waimanalo and Waianae, Oahu. Larval mines of LEAFMINER FLIES (*Liriomyza* spp.) heavy, especially on older leaves, in 0.1 acre of tomato at Kahului, Maui. Mines light in 1 acre of 12-inch plants of same crop at Waianae; adults 1 per 2 plants. Mines moderate, 50 percent of older leaves heavily infested, in 0.25 acre each of cucumber and zucchini at Kahului, Maui. (Miyahira, Kawamura). Adults of GREEN PEACH APHID (*Myzus persicae*) light in 0.1 acre of bell pepper at Kahului; 75 percent mummified by a braconid. (Miyahira).

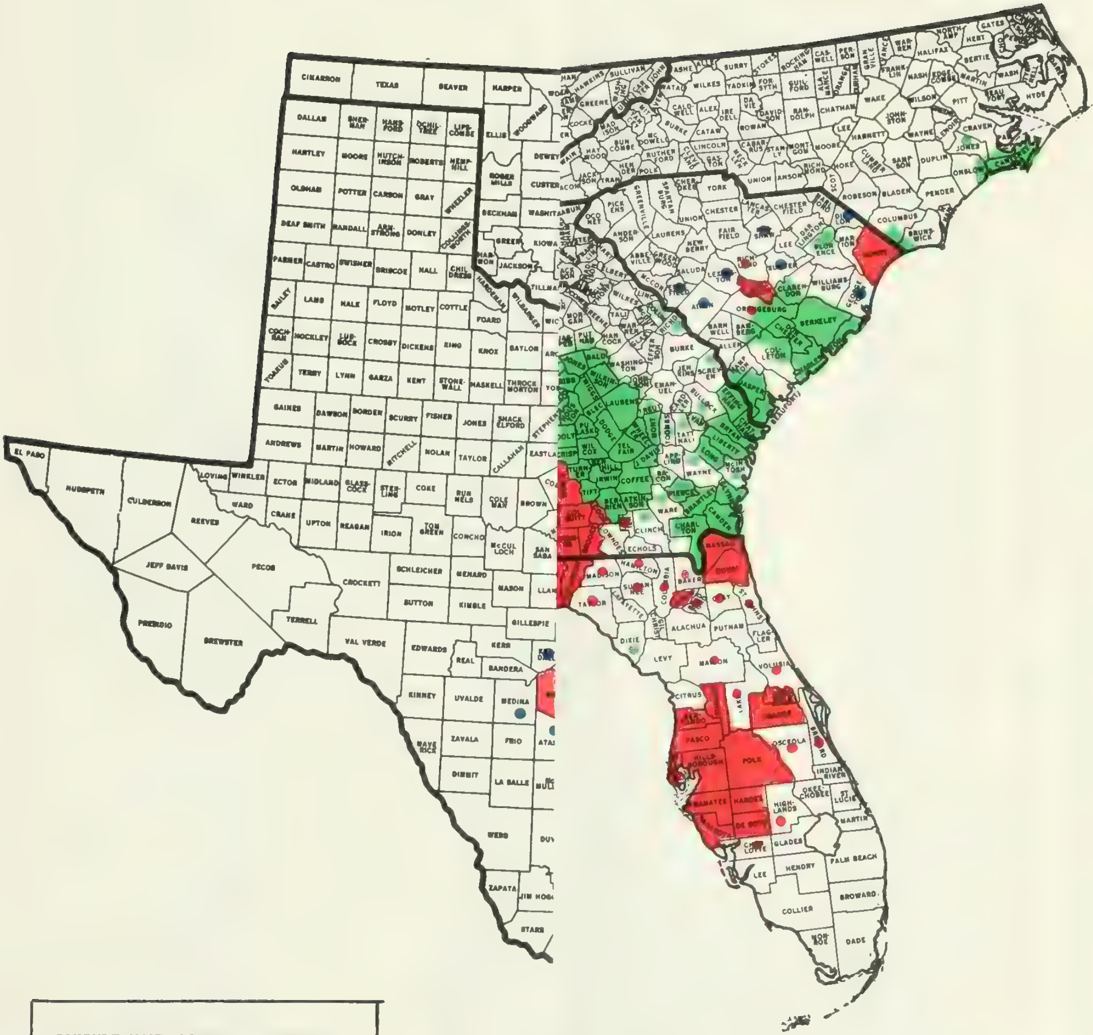
Fruits and Nuts - COCONUT SCALE (*Aspidiotus destructor*) light on older fronds of 25 coconut trees at Hawaii Kai, Oahu; nymphs of *Telsimia nitida* (a lady beetle) abundant amid scale colonies. *A. destructor* still trace in papaya fields at Waimanalo. (Kawamura).

Beneficial Insects - All stages of a LADY BEETLE (*Coccinella septempunctata brucki*) moderate in 0.5 acre of daikon (*Raphanus sativus longipinnatus*) moderately infested with *Myzus persicae* (green peach aphid). Heavy parasitism by a BRACONID (*Lysiphlebus testaceipes*) of heavy population of *Aphis gossypii* (cotton aphid) which infested inflorescence of *Panicum* sp. at Hanapepe, Kauai. (Sugawa). Galls of LANTANA GALL FLY (*Eutreta xanthochaeta*) up to 4 per foot of branch of *Lantana camara* in wastelands at Manele Bay, Lanai, and Kaaawa, Oahu. Larval mines of LANTANA HISPID (*Uroplata girardi*) heavy on lantana in pastures at Nahiku, Maui, and Kaaawa. Adults light at Kaaawa; about 10 per 4-foot bush. (Ah Sam, Miyahira, Kashiwai).

Miscellaneous Pests - Collected 6 specimens (1 adult and 5 nymphs) of a REDUVIID BUG (*Alloeocranum biannulipes*) in March 1969 at Kalihi, Oahu, by D. Tsuda from tenebrionid infested grain. *A. biannulipes* first collected by R. Perkins at Waianae, and reported in State in 1901. Two additional specimens collected by E. Sawa in Barbers Point area during 1954. Recovered 1,000+ adults of a SCIARID FLY (*Sciara garretti*) from light traps at Ewa and Waipahu, Oahu, during first week of January. (Au).

Weather of the week continued from page 30.

TEMPERATURE: Cold air continued to pour into the Northern States from Canada. The mercury at Cut Bank, Montana, plunged to below zero Saturday morning January 9 and remained below zero until Friday. Temperatures at Cut Bank from Monday to Thursday ranged from 33° Wednesday morning to 17° below zero Tuesday and Thursday afternoons. Bismarck, North Dakota, registered 35° below zero Friday morning. The coldest temperature that has come to our attention is 39° below zero at Stillwater Reservoir, New York, Wednesday morning. On Tuesday morning, subzero weather occurred over the Great Plains as far south as Nebraska. Subfreezing temperatures occurred along the Mexican border on Monday and Thursday mornings. In sharp contrast to bone chilling temperatures that prevailed from Montana to New England is the near record warmth in portions of the South. Southern Texas registered temperatures in the 80's on almost every afternoon. Weekly mean temperatures were below normal from the Continental Divide in Montana and Wyoming to the Atlantic Ocean. Much of the northern and central Great Plains averaged 10° to 22° colder than normal. Above normal temperatures prevailed west of the Continental Divide and across the southern half of the Nation. Parts of Texas and Louisiana averaged 10° to 12° warmer than normal. (Summary Supplied by Environmental Data Service, ESSA.)



CONSULT YOUR STATE OR FEDERAL
PLANT PROTECTION INSPECTOR OR
YOUR COUNTY AGENT FOR ASSISTANCE
REGARDING EXACT AREAS UNDER
REGULATION AND REQUIREMENTS FOR
MOVING REGULATED ARTICLES.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PROTECTION DIVISION
COOPERATING WITH AFFECTED STATES

Revised October 12, 1970

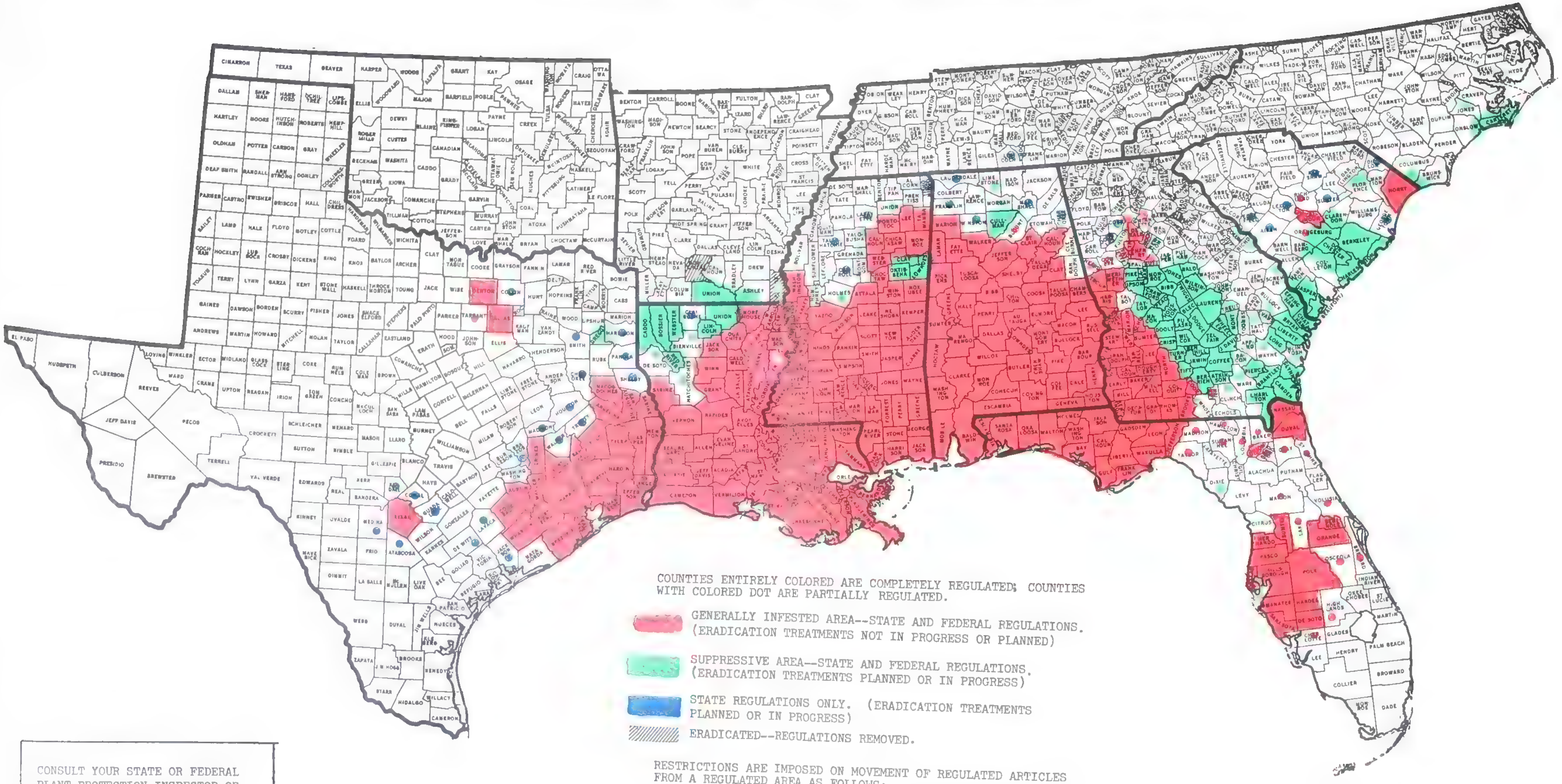
THE FOLLOWING CROPS OR ARTICLES FROM GENERALLY INFESTED AREAS MUST BE MOVED UNDER CERTIFICATE OR PERMIT YEAR-ROUND EXCEPT AS INDICATED:

1. Soil, compost, decomposed manure, humus, muck, and peat, separately or with other things.
    - Soil samples shipped to approved laboratories do not require attachment of certificate or permit.*
    - Compost, decomposed manure, humus, and peat are exempt** if dehydrated, ground, pulverized, or compressed.
2. Plants with roots.
3. Grass sod.
4. Hay and straw.
    - Hay and straw are exempt**if used for packing or bedding.
5. Logs, pulpwood, and stumpwood.
    - Logs and pulpwood are exempt**provided the railroad loading site has been treated.
    - Stumpwood, if free of excessive amounts of soil, is exempt** provided the railroad loading site has been treated and the stumpwood is consigned to a processing plant.*

6. Used mechanized soil-moving equipment.
    - Used mechanized soil-moving equipment is exempt** if cleaned and repainted.
7. Any other products, articles, or means of conveyance of any character whatsoever, not covered by the above, when it is determined by an inspector that they present a hazard of spread of the imported fire ant and the person in possession thereof has been so notified.

THE FOLLOWING ARTICLES FROM SUPPRESSIVE AREAS MUST BE MOVED UNDER CERTIFICATE OR PERMIT YEAR-ROUND:

IMPORTED FIRE ANT QUARNTINES



COUNTIES ENTIRELY COLORED ARE COMPLETELY REGULATED; COUNTIES WITH COLORED DOT ARE PARTIALLY REGULATED.

🟥 GENERALLY INFESTED AREA--STATE AND FEDERAL REGULATIONS. (ERADICATION TREATMENTS NOT IN PROGRESS OR PLANNED)

🟩 SUPPRESSIVE AREA--STATE AND FEDERAL REGULATIONS. (ERADICATION TREATMENTS PLANNED OR IN PROGRESS)

🟦 STATE REGULATIONS ONLY. (ERADICATION TREATMENTS PLANNED OR IN PROGRESS)

▨ ERADICATED--REGULATIONS REMOVED.

RESTRICTIONS ARE IMPOSED ON MOVEMENT OF REGULATED ARTICLES FROM A REGULATED AREA AS FOLLOWS:

1. FROM RED INTO OR THROUGH GREEN, BLUE, OR WHITE.
2. FROM GREEN INTO OR THROUGH WHITE OR BLUE.
3. GREEN INTO GREEN.
4. WITHIN GREEN.*
5. FROM BLUE INTO ANY OTHER AREA.**

*IF REQUIRED BY AN AUTHORIZED INSPECTOR.

**IF REQUIRED BY APPROPRIATE STATE QUARANTINE OR BY AN AUTHORIZED INSPECTOR.

SEE REVERSE SIDE FOR REQUIREMENTS CONCERNING CERTIFICATION OF REGULATED ARTICLES.

CONSULT YOUR STATE OR FEDERAL PLANT PROTECTION INSPECTOR OR YOUR COUNTY AGENT FOR ASSISTANCE REGARDING EXACT AREAS UNDER REGULATION AND REQUIREMENTS FOR MOVING REGULATED ARTICLES.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PROTECTION DIVISION
COOPERATING WITH AFFECTED STATES

Revised October 12, 1970

THE FOLLOWING CROPS OR ARTICLES FROM GENERALLY INFESTED AREAS MUST BE MOVED UNDER CERTIFICATE OR PERMIT YEAR-ROUND EXCEPT AS INDICATED:

1. Soil, compost, decomposed manure, humus, muck, and peat, separately or with other things.
    Soil samples shipped to approved laboratories do not require attachment of certificate or permit.*
    Compost, decomposed manure, humus, and peat are exempt** if dehydrated, ground, pulverized, or compressed.
2. Plants with roots.
3. Grass sod.
4. Hay and straw.
    Hay and straw are exempt**if used for packing or bedding.
5. Logs, pulpwood, and stumpwood.
    Logs and pulpwood are exempt**provided the railroad loading site has been treated.
    Stumpwood, if free of excessive amounts of soil, is exempt** provided the railroad loading site has been treated and the stumpwood is consigned to a processing plant.*

6. Used mechanized soil-moving equipment.
    Used mechanized soil-moving equipment is exempt** if cleaned and repainted.
7. Any other products, articles, or means of conveyance of any character whatsoever, not covered by the above, when it is determined by an inspector that they present a hazard of spread of the imported fire ant and the person in possession thereof has been so notified.

THE FOLLOWING ARTICLES FROM SUPPRESSIVE AREAS MUST BE MOVED UNDER CERTIFICATE OR PERMIT YEAR-ROUND:

1. Bulk soil.
2. Used mechanized soil-moving equipment.
3. Any other products, articles, or means of conveyance of any character whatsoever, not covered by the above, when it is determined by an inspector that they present a hazard of spread of the imported fire ant and the person in possession thereof has been so notified.

---

*Information as to designated laboratories and processing plants may be obtained from an inspector.

**Exempt if not exposed to infestation after cleaning or other prescribed handling.

SURVEY METHODS

Selected References for First Half of 1970

Part XXXIII

Additional copies of Parts I through XXXIII of this bibliography are available from Economic Insect Survey and Detection.

POPULATION MEASUREMENT

RANEY, H. G., EIKENBARY, R. D. and FLORA, N. W. 1970. Population density of the pecan weevil under 'Stuart' pecan trees. J. Econ. Ent. 63(3):697-700.
Methods used to estimate populations included

SPECHT, H. B. 1970. The apple aphid, *Aphis pomi* (Homoptera: Aphididae), population on apple under autumnal conditions in a controlled environment cabinet. Canad. Ent. 102(5):623-627.

STRONG, R. G. 1970. Distribution and relative abundance of stored-product insects in California: a method of obtaining sample populations. J. Econ. Ent. 63(2):591-596.

THOMPSON, P. H. and PECHUMAN, L. L. 1970. Sampling populations of *Tabanus quinquetvittaus* about horses in New Jersey, with notes on the identity and ecology. J. Econ. Ent. 63(1):151-155. Should be *Tabanus quinquevittatus*.

FORECASTING

ROBERTS, S. J., DEWITT, J. R. and ARMBRUST, E. J. 1970. Predicting spring hatch of the alfalfa weevil. J. Econ. Ent. 63(3):921-923.

REARING

CHIPPENDALE, G. M. 1970. Development of artificial diets for rearing the Angoumois grain moth. J. Econ. Ent. 63(3):844-848.

COUDRIET, D. L. 1970. Rearing the orange tortrix on a synthetic diet. J. Econ. Ent. 63(3):1004-1005.

FREDEEN, F. J. H. and GLEN, G. S. 1970. The survival and development of *Leptocera caenosa* (Diptera: Sphaeroceridae) in laboratory cultures. Canad. Ent. 102(2):164-171.

GARDINER, L. M. 1970. Rearing wood-boring beetles (Cerambycidae) on artificial diet. Canad. Ent. 102(1):113-117.

GREENBERG, B. 1970. Sterilizing procedures and agents, antibiotics and inhibitors in mass rearing of insects. Ent. Soc. Amer. Bul. 16(1):31-36.

GREENE, G. L. 1970. Hatching of bean leaf roller eggs as influenced by insect diet components. J. Econ. Ent. 63(1):321.

HARRIS, R. H. G. 1970. Rearing *Numicia viridis* Muir (Homoptera: Tropiduchidae) in captivity. Ent. Soc. South. Afr. J. 33(1):49-52.

HERBERT, E. W., BICKLEY, W. E. and SHIMANUKI, H. 1970. The brood-rearing capability of caged honey bees fed dandelion and mixed pollen diets. J. Econ. Ent. 63(1):215-218.

JACKLIN, S. W. and YONCE, C. E. 1970. Emergence, longevity, and fecundity of adult plum curculio reared from two sizes of larvae at two temperatures in soil with a range of moisture. J. Econ. Ent. 63(2):673-674.

JACOBSON, L. A. 1970. Laboratory ecology of the red-backed cutworm *Euxoa ochrogaster* (Lepidoptera: Noctuidae). Canad. Ent. 102(1):85-89.

LAING, D. R. and HAGEN, K. S. 1970. A xenic, partially synthetic diet for the oriental fruit moth, *Grapholitha molesta* (Lepidoptera: Olethreutidae). Canad. Ent. 102(2):250-252.
Includes rearing

LEWIS, W. J. and BURTON, R. L. 1970. Rearing *Microplitis croceipes* in the laboratory with *Heliothis zea* as hosts. J. Econ. Ent. 63(2):656-658.

LUM, P. T. M. and FLAHERTY, B. R. 1970. Regulating oviposition by *Plodia interpunctella* in the laboratory by light and dark conditions. J. Econ. Ent. 63(1):236-239.
Rearing included

REDFERN, R. E. and RAULSTON, J. R. 1970. Improved rearing techniques for the southern armyworm. J. Econ. Ent. 63(1):296-297.

RIDGWAY, R. L., MORRISON, R. K. and BADGLEY, M. 1970. Mass rearing a green lacewing. J. Econ. Ent. 63(3):834-836.

ROLLINSON, W. D., HUBBARD, H. B., JR. and LEWIS, F. B. 1970. Mass rearing of the European pine sawfly for production of the nuclear polyhedrosis virus. J. Econ. Ent. 63(1):343-344.

SCHROEDER, W. J. 1970. Rearing the pecan bud moth on artificial diet. J. Econ. Ent. 63(2):650-651.

SCHWARTZ, P. H., JR. and JURIMAS, J. P. 1970. An inexpensive machine for dispensing soil and water into 1-oz plastic cups used to rear Japanese beetles in the laboratory. J. Econ. Ent. 63(3):992-993.

SHANDS, W. A., HOLMES, R. L. and SIMPSON, G. W. 1970. Improved laboratory production of eggs of *Coccinella septempunctata*. J. Econ. Ent. 63(1):315-317.

SKELTON, T. E. and HUNTER, P. E. 1970. Laboratory rearing and reproduction of the spotted cucumber beetle. J. Econ. Ent. 63(3):948-950.

STEWART, P. A. and BAKER, A. P., JR. 1970. Rate of growth of larval tobacco hornworms reared on tobacco leaves and on artificial diet. J. Econ. Ent. 63(2):535-536.

TOBA, H. H., KISHABA, A. N. and PANGALDAN, R. 1970. A rating system for evaluating the suitability of larval diets for cabbage loopers. J. Econ. Ent. 63(3):759-760.

TZANAKAKIS, M. E., ECONOMOPOULOS, A. P. and TSITSIPIS, J. A. 1970. Rearing and nutrition of the olive fruit fly. 1. Improved larval diet and simple containers. J. Econ. Ent. 63(1):317-318.

WISEMAN, B. R., MCMILLIAN, W. W. and BOWMAN, M. C. 1970. Retention of laboratory diets containing corn kernels or leaves of different ages by larvae of the corn earworm and the fall armyworm. J. Econ. Ent. 63(3):731-732.

EQUIPMENT AND TECHNIQUES

BAILEY, D. L. 1970. Forced air for separating pupae of house flies from rearing medium. J. Econ. Ent. 63(1):331-333.

BEAVERS, J. B. and OLDFIELD, G. N. 1970. Portable platforms for watering leaves in acrylic cages containing small leaf-feeding arthropods. J. Econ. Ent. 63(1):312-313.

COAKER, T. H. and DODD, G. D. 1970. An apparatus for dispensing mechanically the eggs of the cabbage root fly (*Erioischia brassicae* (Bch.) (Dipt., Muscidae)). Bul. Ent. Res. 59(4):703-705.

DATERMAN, G. E. 1970. An improved technique for mating European pine shoot moth, *Rhyacionia buoliana* (Lepidoptera: Olethreutidae) in the laboratory. Canad. Ent. 102(5):541-545.

FLITTERS, N. E. 1970. Method of providing multiple photoperiodic regimens for studies of diapause in a bioclimatic cabinet. J. Econ. Ent. 63(3):999-1000.

HENDRICKS, D. E. and GRAHAM, H. M. 1970. Oil-soluble dye in larval diet for tagging moths, eggs, and spermatophores of tobacco budworms. J. Econ. Ent. 63(3):1019-1020.

HOWER, A. A., JR. and FERRER, F. R. 1970. An artificial oviposition technique for the alfalfa weevil. J. Econ. Ent. 63(3):761-764.

JAYCOX, E. R. 1970. Collecting and counting honey bees with a vacuum cleaner. J. Econ. Ent. 63(1):327-328.

KRING, J. B. 1970. Dialyzing membrane for aphid cages. J. Econ. Ent. 63(3):1032-1033.

LAMANSKY, K. W. and DOLPHIN, R. E. 1970. Improved method of puncturing thinning apples used to rear the lesser peach tree borer. J. Econ. Ent. 63(1):307-308.

MOOREHEAD, G. E. and MALTBY, H. L. 1970. A container for releasing *Anaphes flavipes* from parasitized eggs of *Oulema melanopus*. J. Econ. Ent. 63(2):675-676.

PHILLIPS, J. H. H. and PROCTOR, J. R. 1970. Development of methods for sampling the oriental fruit moth, *Grapholitha molesta* (Lepidoptera: Tortricidae), in an Ontario peach orchard. Canad. Ent. 102(4):454-471.

PROVERBS, M. D. and LOGAN, D. M. 1970. A rotating oviposition cage for the codling moth, *Carpocapsa pomonella*. Canad. Ent. 102(1):42-49.

RIDGWAY, W. O. and WHITTAM, D. 1970. A scale collection method for pink bollworm moth holding cages. J. Econ. Ent. 63(3):1012-1013.

SCHWARTZ, P. H., JR. and JURIMAS, J. P. 1970. An inexpensive machine for dispensing soil and water into 1-oz plastic cups used to rear Japanese beetles in the laboratory. J. Econ. Ent. 63(3):992-993.

SMITH, F. F., WEBB, R. E., BOSWELL, A. L. and COMBS, G. F., JR. 1970. A circular rotating cage for obtaining uniform oviposition by *Liriomyza munda* in exposed plants. J. Econ. Ent. 63(2):655-656.

STEWART, P. A., BAUMHOVER, A. H., BENNETT, L. S. and HOBGOOD, J. M., JR. 1970 A method of sexing larvae of tobacco and tomato hornworms. J. Econ. Ent. 63(3):994-995.

SWOYER, G. F. 1970. A simple technique for making insect-testing cages. J. Econ. Ent. 63(2):679-680.

TARDIF, R. and SECREST, J. P. 1970. Devices for cleaning and counting eggs of the gypsy moth. J. Econ. Ent. 63(2):678-679.

TIMBERS, G. E. and DANKS, H. V. 1970. A liquid-nitrogen operated chamber for insect supercooling studies. Canad. Ent. 102(1):90-94.

WONG, T. T. Y. and CLEVELAND, M. L. 1970. Fluorescent powder for marking deciduous fruit moths for studies of dispersal. J. Econ. Ent. 63(1):338-339.

TRAPS

BATISTE, W. C. 1970. A timing sex-pheromone trap with special reference to codling moth collections. J. Econ. Ent. 63(3):915-918.

BERTRAM, D. S., VARMA, M. G. R., PAGE, R. C. and HEATHCOTE, O. H. U. 1970. A betalight trap for mosquito larvae. Roy. Soc. Trop. Med. and Hyg. Trans. 64(1): 26.

DAVIES, J. B. 1970. Two traps for biting Diptera currently in use in Trinidad. Roy. Soc. Trop. Med. and Hyg. Trans. 64(1):25-26.

DEBOLT, J. W. 1970. Dispensers for baiting traps equipped with blacklight lamps with synthetic sex pheromone of the female cabbage looper. J. Econ. Ent. 63(1):141-144.

FARIAS, G. J. and NAKAGAWA, S. 1970. Host vs. nonhost plants as sites for baited traps for Mediterranean fruit flies. J. Econ. Ent. 63(2):662-663.

GOONEWARDENE, H. F., ZEPP, D. B. and GROSVENOR, A. E. 1970. Virgin female Japanese beetles as lures in field traps. J. Econ. Ent. 63(3):1001-1003.

HOY, J. B. 1970. Trapping the stable fly by using CO_2 or CO as attractants. J. Econ. Ent. 63(3):792-795.

MORGAN, N. O., PICKENS, L. G., and THIMIJAN, R. W. 1970. House flies and stable flies captured by two types of traps. J. Econ. Ent. 63(2):672-673.

POWERS, W. J. and HILTY, J. W. 1970. A plastic cylindrical sticky trap for collecting alate aphids. J. Econ. Ent. 63(3):998.

STEWART, P. A. and LAM, J. J., JR. 1970. Capture of forest insects in traps equipped with blacklight lamps. J. Econ. Ent. 63(3):871-873.

THIMIJAN, R. W., PICKENS, L. G. and MORGAN, N. O. 1970. A trap for house flies. J. Econ. Ent. 63(3):1030-1031.

TOBA, H. H., KISHABA, A. N., WOLF, W. W. and GIBSON, T. 1970. Spacing of screen traps baited with synthetic sex pheromone of the cabbage looper. J. Econ. Ent. 63(1):197-200.

WHITE, L. D., BACKUS, D. A. and HUTT, R. B. 1970. Damage to fruit and leaves of apple trees caused by bactericidal ultraviolet light used to trap codling moths. J. Econ. Ent. 63(3):1003-1004.

ATTRACTANTS

CADE, S. C., HRUTFIORD, B. F. and GARA, R. I. 1970. Identification of a primary attractant for Gnathotrichus sulcatus isolated from western hemlock logs. J. Econ. Ent. 63(3):1014-1015.

DEAN, R. W. and ROELOFS, W. L. 1970. Synthetic sex pheromone of the red-banded leaf roller moth as a survey tool. J. Econ. Ent. 63(2):684-686.

DOOLITTLE, R. E., KEISER, I. and MIYASHITA, D. H. 1970. Comparative attractiveness to the melon fly of mixtures of cue-lure and 4-(p-Hydroxphenyl)-2-butanone. J. Econ. Ent. 63(1):339-340.

GLASS, E. H., ROELOFS, W. L., ARN, H. and COMEAU, A. 1970. Sex pheromone trapping red-banded leaf roller moths and development of a long-lasting polyethylene wick. J. Econ. Ent. 63(2):370-373.

GOONEWARDENE, H. F. 1970. Effect of wick area on attractancy of some lures for the Japanese beetle. J. Econ. Ent. 63(2):663-665.

HAMILTON, D. W., SCHWARTZ, P. H., TOWNSHEND, B. G. and JESTER, C. W. 1970. Attractants for Japanese beetles screened in the field 1965-67. J. Econ. Ent. 63(3):832-834.

HARDEE, D. D., CLEVELAND, T. C., DAVIS, J. W. and CROSS, W. H. 1970. Attraction of boll weevils to cotton plants and to males fed on three diets. J. Econ. Ent. 63(3):990-991.

HOLBROOK, F. R., STEINER, L. F., FUJIMOTO, M. S. and CUNNINGHAM, R. T. 1970. Effects of location on responses of male melon flies to fiberboard blocks impregnated with cue-lure, a male attractant. J. Econ. Ent. 63(3):869-870.

HOY, J. B. 1970. Trapping the stable fly by using CO_2 or CO as attractants. J. Econ. Ent. 63(3):792-795.

JACOBSON, M., SCHWARZ, M. and WATERS, R. M. 1970. Gypsy moth sex attractants: a reinvestigation. J. Econ. Ent. 63(3):943-945.

KISHABA, A. N., TOBA, H. H., WOLF, W. W., and VAIL, P. V. 1970. Response of laboratory-reared male cabbage looper to synthetic sex pheromone in the field. J. Econ. Ent. 63(1):178-181.

KRING, J. B. 1970. Red spheres and yellow panels combined to attract apple maggot flies. J. Econ. Ent. 63(2):466-469.

LADD, T. L., JR. 1970. Sex attraction in the Japanese beetle. J. Econ. Ent. 63(3):905-908.

MCDONOUGH, L. M., GEORGE, D. A., and LANDIS, B. J. 1970. Partial structure of two sex pheromones of the corn earworm, Heliothis zea. J. Econ. Ent. 63(2):408-412.

MCGOVERN, T. P., FIORI, B., BEROZA, M. and INGANGI, J. C. 1970. Propyl 1,4-Benzodioxan-2-carboxylate, a new attractant for the European chafer. J. Econ. Ent. 63(1):168-171.

NAKAGAWA, S., FARIAS, G. J. and STEINER, L. F. 1970. Response of female Mediterranean fruit flies to male lures in the relative absence of males. J. Econ. Ent. 63(1):227-229.

PETTERSSON, J. 1970. An aphid sex attractant. I. Biological studies. Entomologica Scand. 1(1):63-73.

REDFERN, R. E., BUTT, B. A. and CANTU, E. 1970. Bioassay of the sex pheromone of the southern armyworm. J. Econ. Ent. 63(2):658.

REJESUS, R. S. and REYNOLDS, H. T. 1970. Demonstration of the presence of a female sex pheromone in the cotton leaf perforator. J. Econ. Ent. 63(3):961-964.

ROELOFS, W. L. and COMEAU, A. 1970. Lepidopterous sex attractants discovered by field screening tests. J. Econ. Ent. 63(3):969-974.

SNOW, W. F. 1970. The effect of a reduction in expired carbon dioxide on the attractiveness of human subjects to mosquitoes. Bul. Ent. Res. 60(1):43-48.

SODERSTROM, E. L. 1970. Effectiveness of green electroluminescent lamps for attracting stored-product insects. J. Econ. Ent. 63(3):726-731.

STATLER, M. W. 1970. Effects of gamma radiation on the ability of the adult female gypsy moth to attract males. J. Econ. Ent. 63(1):163-164.

STRUBLE, D. L. 1970. A sex pheromone in the forest tent caterpillar. J. Econ. Ent. 63(1):295-296.

STRUBLE, D. L. and JACOBSON, L. A. 1970. A sex pheromone in the red-backed cutworm. J. Econ. Ent. 63(3):841-844.

TASHIRO, H., Beroza, M., MCGOVERN, T. P. and GREEN, N. 1970. Chemicals evaluated as attractants for the European chafer, Amphimallon majalis (Razoumowsky). U.S. Dept. Agr. ARS 33-130. 46 pp.

THOMPSON, A. C. and COAUTHORS. 1970. Constituents of the cotton bud. XVI. The attractancy response of the boll weevil to the essential oils of a group of host and nonhost plants. J. Econ. Ent. 63(3):751-753.

UNITED STATES DEPARTMENT OF AGRICULTURE
Hyattsville, Maryland 20782

OFFICIAL BUSINESS

POSTAGE & FEES PAID
United States Department of Agriculture

0004 UNALBBPISB422 03001 0001
USDA NAT AGR LIB BELTSVILLE
BR
PLANT INDUS STA
BELTSVILLE MD 20003